1. Determine whether the function below is 1-1.

$$f(x) = (3x - 21)^3$$

A. No, because there is a y-value that goes to 2 different x-values.

B. Yes, the function is 1-1.

C. No, because there is an x-value that goes to 2 different y-values.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because the domain of the function is not $(-\infty, \infty)$.

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2. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x+3} - 4$$

A. $f^{-1}(8) \in [-2, -1.42]$

B. $f^{-1}(8) \in [-2.82, -2.48]$

C. $f^{-1}(8) \in [5.43, 5.73]$

D. $f^{-1}(8) \in [-0.6, -0.48]$

E. $f^{-1}(8) \in [-2.56, -2.07]$

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3. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{4x - 25} \text{ and } g(x) = 3x^2 + 5$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [4.25, 9.25]$

B. The domain is all Real numbers except $x = a$, where $a \in [0.25, 7.25]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-8.8, -0.8]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-6.4, -1.4]$ and $b \in [3.33, 10.33]$

E. The domain is all Real numbers.

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4. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -15$ and choose the interval that $f^-1(-15)$ belongs to.

$$f(x) = 5x^2 - 3$$

A. $f^{-1}(-15) \in [2.29, 3.07]$

B. $f^{-1}(-15) \in [4.54, 5.58]$

C. $f^{-1}(-15) \in [0.83, 1.66]$

D. $f^{-1}(-15) \in [1.78, 1.96]$

E. The function is not invertible for all Real numbers.

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5. Find the inverse of the function below. Then, evaluate the inverse at $x = 6$ and choose the interval that $f^-1(6)$ belongs to.

$$f(x) = \ln(x - 4) + 3$$

A. $f^{-1}(6) \in [9.39, 11.39]$

B. $f^{-1}(6) \in [22028.47, 22031.47]$

C. $f^{-1}(6) \in [11.09, 17.09]$

D. $f^{-1}(6) \in [23.09, 30.09]$

E. $f^{-1}(6) \in [8102.08, 8111.08]$

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6. Determine whether the function below is 1-1.

$$f(x) = (5x - 31)^3$$

A. Yes, the function is 1-1.

B. No, because there is an x-value that goes to 2 different y-values.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because the domain of the function is not $(-\infty, \infty)$.

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7. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 10$ and choose the interval that $f^-1(10)$ belongs to.

$$f(x) = 4x^2 - 5$$

A. $f^{-1}(10) \in [0.75, 1.29]$

B. $f^{-1}(10) \in [1.22, 2.45]$

C. $f^{-1}(10) \in [2.14, 4.12]$

D. $f^{-1}(10) \in [6.06, 7.1]$

E. The function is not invertible for all Real numbers.

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8. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{5x + 26} \text{ and } g(x) = 8x^2 + 6x$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-6.2, -3.2]$

B. The domain is all Real numbers except $x = a$, where $a \in [1.17, 9.17]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-1.8, 3.2]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [5.33, 6.33]$ and $b \in [-8.6, -5.6]$

E. The domain is all Real numbers.

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9. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = -x^3 - 3x^2 - 2x - 4 \text{ and } g(x) = x^3 + 4x^2 + 3x - 3$$

A. $(f \circ g)(-1) \in [2, 3]$

B. $(f \circ g)(-1) \in [-7, -4]$

C. $(f \circ g)(-1) \in [-20, -13]$

D. $(f \circ g)(-1) \in [-30, -17]$

E. It is not possible to compose the two functions.

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10. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = -x^3 + 3x^2 + 4x - 1 \text{ and } g(x) = -x^3 + 2x^2 - x + 2$$

A. $(f \circ g)(1) \in [-83, -72]$

B. $(f \circ g)(1) \in [-90, -82]$

C. $(f \circ g)(1) \in [10, 18]$

D. $(f \circ g)(1) \in [-4, 6]$

E. It is not possible to compose the two functions.
